Listing of Claims:

Claims 1 - 14 cancelled.

15. (Original) An intravascular imaging catheter comprising:

a catheter body comprising a proximal portion and a distal portion; and

a radiation detector array disposed at the distal portion of the catheter body, wherein the radiation detector are capable of operating both at a gross count rate and in an imaging mode.

16. (Original) The catheter of claim 15 further comprising means for operating the radiation detector array selectively in at least the gross count rate mode and the imaging mode.

17. (Original) The catheter of claim 15 wherein the radiation detector array in the search mode sums pixels in the radiation detector(s) to obtain a gross count of radiopharmaceuticals in a portion of a body lumen.

18. (Original) The catheter of claim 15 wherein the radiation detector array in the imaging mode obtains a higher resolution of detail of a body lumen.

19. (Original) The catheter of claim 15 wherein the radiation detector array provides a spatial resolution of one to three millimeters.

20. (Original) The catheter of claim 15 wherein the radiation detector array comprises:

a scintillator disposed in the channel of the catheter body.

an optical fiber disposed within the channel in the catheter body, wherein a distal end of the optical fiber is coupled to the scintillator;

a photodetector coupled to a proximal end of the optical fiber; and

a data acquisition assembly coupled to the photodetector.

21. (Original) The catheter of claim 15 wherein the radiation detector array comprises an array of scintillators distributed along a length of the catheter body.

22. (Original) The catheter of claim 21 wherein the array of scintillators are distributed along a length between approximately 5 mm and 50 mm.

23. (Original) The catheter of claim 21 wherein each of the scintillators in the array of scintillators is coupled to an individual optical fiber.

24. (Original) The catheter of claim 21 wherein the array of scintillators comprise a plurality of scintillators aligned along an axis, wherein each of the scintillators has an emission spectrum that is offset in wavelength from the other scintillators in the array.

25. (Original) The catheter of claim 24 wherein a proximal scintillator of the array is optically coupled to an optical fiber that is attachable to a wavelength dispersive medium.

26. (Original) The catheter of claim 15 further comprising an flexible membrane disposed at the distal portion of the catheter body, wherein the radiation detector array is disposed within the balloon.

27. (Original) The catheter of claim 26 wherein the radiation detector array comprises:

a scintillating fiber coupled to an optical fiber, wherein the scintillating fiber is disposed within the flexible membrane;

a moveable imaging shield disposed over a portion of the scintillating fiber; and

a liquid scintillator disposed within the flexible membrane.

28. (Original) The catheter of claim 26 wherein the radiation detector array comprises a flexible array of semiconductor detectors coupled to the flexible membrane, wherein the balloon in an expanded configuration places the array of radiation detectors adjacent a body lumen wall.

29. (Original) The catheter of claim 26 further comprising:

an anode disposed within the flexible membrane;

a moveable insulating sleeve disposed over the anode;

cathodes attached to the flexible membrane; and

an Xenon gas disposed in the flexible membrane.

30. (Original) The catheter of claim 15 wherein the radiation detector array comprises:

an optical fiber moveably disposed within the catheter body;

a laser that delivers a laser light having a first wavelength;

an imaging plate disposed around a distal portion of the optical fiber that receives beta particles, wherein the laser light interacts with the imaging plate so as to cause a readout light to be emitted from the imaging plate and transmitted down the optical fiber, wherein the readout light has a second wavelength, the second wavelength being different from the first wavelength.

31. (Original) The catheter of claim 30 further comprising a filter coupled to a proximal end of the optical fiber.

32. (Original) The catheter of claim 30 further comprising a mirror coupled to a distal end of the optical fiber to focus the laser light and readout light.

Claims 33 - 88 cancelled.